presently renders untenable. As examples in point, one need only recall the testing of foodstuffs for arsenic, and the alleged conversion of this element into antimony. Wherefore, when the chemist buys his chemicals let him remember the legal tag above quoted, and not trust too implicitly to the manufacturer who supplies them.

The book before us will help to minimise the labour involved in satisfying oneself on this matter. It deals with some hundreds of reagents used by the chemist, and with a few of those generally employed by the microscopist. As regards its plan, the substances are arranged in alphabetical order, beginning with "acetic acid" and ending with "zinc sulphate." Under each heading are described, very briefly, a few of the more prominent characters of the reagent, such as its formula, molecular weight, boiling point, specific gravity, or crystalline form. Then follow, as a rule, a number of "tests for impurities," in which are indicated the probable foreign substances to be met with in the article under examination, and the characteristic methods of detecting them. A paragraph or two dealing with the "quantitative estimation" of the reagent is added in those cases where the addition is applicable. Following this come notes upon "uses" or "uses and storage," in which mention is made of the purpose for which the reagent is generally required, and hints given as to how it should be kept—*e.g.* whether protected from light, in a cool place, under oil, and so on. Finally the "commercial varieties" of the substance are shortly indicated.

On account of the number of articles dealt with, the information afforded is necessarily for the most part very brief, and is always concisely put. Fairly full descriptions, however, are given in the case of some of the more important reagents: thus ten pages are devoted to alcohols, six to ether, and eight to hydrochloric acid; whilst tables of the strengths corresponding to various values of specific gravity are appended to the sections dealing with such reagents as acetic acid, ammonia, alcohol, and the mineral acids. References, and useful ones, are frequently given to literature in which further information is to be found; and in place of the original German sources the translators have very considerately indicated abstracts and papers to be found in English journals and text-books.

All the ordinary reagents are described, and also a number of those less frequently used. As regards the inclusion of the latter, the present writer has tested the volume in respect of a few of the less common reagents, such as the persulphates, iodeosin, and nitroso-β-naphthol (which latter, by the way, can be recommended for the separation of cobalt from nickel), and finds them duly mentioned except in the case of the persulphate.

The book is hardly one which calls for much criticism. The value of such a work consists in its bringing conveniently together the chief data pertaining to the various substances, so far as they are criteria of purity. If a good selection is made, and if the information is accurate, the book saves labour and fulfils its purpose. Judged by this standard the volume can be unreservedly commended. C. SIMMONDS.

OUR BOOK SHELF.

Text-book of Electrochemistry. By Svante Arrhenius. Translated by John McCrae. Pp. xi + 344. (London: Longmans and Co., 1902.) Price 9*s*. 6*d*. net.

THIS work, by the chief founder of modern electrochemical theory, is worthy of a hearty welcome in its English form. It is distinguished from other works on the same subject by being at once more thorough and more simple, the difference being specially apparent in the chapters dealing with potential and electromotive force. Too often the treatment of this branch of the subject leaves the impression (on the student of chemistry at least) that a simple and important result is arrived at from no premisses in particular by some unconvincing mathematical hocus-pocus, wholly devoid of concrete meaning. Prof. Arrhenius is necessarily somewhat mathematical, but the physical significance of each step is so carefully explained that no attentive student of physics or chemistry, with the most rudimentary knowledge of the calculus, can fail to gain a clear idea of the process of reasoning, and, if need be, to reproduce it with understanding. Whilst we have this very desirable treatment of theoretical matters, the practical side of the subject is no less satisfactorily dealt with. In small compass, an immense amount of well-selected and clearly-put information is conveyed; for example, in the two pages which are devoted to the electric arc, the essential features of the phenomenon are given with a precision and conciseness infrequent in physical text-books. The chapter on electroanalysis affords a similar instance of happy exposition. Throughout the book, and especially where matters of recent controversy are under discussion, there is manifested a temperateness of language and sobriety of judgment which cannot be too highly commended.

The first two chapters of the volume give an account of fundamental physical and chemical conceptions, and of the older electrochemical theories. The next five chapters are chiefly concerned with osmotic pressure and the thermodynamical deductions from it, the general conditions of equilibrium, and the velocity of chemical actions. Chapters viii.-xii. are devoted to electrolytic dissociation and the deductions to be drawn from that theory. In chapters xiii.-xv., electromotive force is dealt with; and in the last two chapters are taken up the practical subjects of electroanalysis and the development of heat by the electric current.

The present translation has been made from the German edition, which is a somewhat expanded form of the Swedish original. The English version is well done, and we have to thank Dr. McCrae in addition for an excellent index and a very useful appendix of references. J. W.

A Manual of Indian Timbers. By T. S. Gamble, M.A., C.I.E., F.R.S., F.L.S. Pp. xxiii + 856; illustrated by photographs of wood sections. New (second) and revised edition. (London: Sampson Low, Marston and Co., Ltd., 1902.)

THE first edition of this important work appeared in 1881, giving the results of investigations made by Sir Dietrich Brandis and his assistants, Messrs. Gamble and Smythies. It was edited by Mr. Gamble, and it contained descriptions of 906 species of Indian timbers. The new edition has been entirely prepared by Mr. Gamble; it deals with about 1450 species, including all, or nearly all, really important timber-woods. The total number of species of trees, shrubs and climbers found in India and Ceylon is estimated to amount to about 5000,

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so that there is room for further extension should hereafter a third edition become necessary.

The book is a very storehouse of information, and this will be realised if we state that for every important, and most other, species the information extends to :—

(1) Size and appearance of tree; whether evergreen or deciduous; mode of branching.
(2) Description of bark.
(3) Description of wood, both sapwood and heartwood, with its colour, hardness, grain, scent, the character of the annual rings, pores, medullary rays, &c.
(4) Distribution, rate of growth, &c., of the trees.
(5) Weight per cubic foot of timber; transverse strength.
(6) Sylvicultural aspect of the species.
(7) Insects injurious to the tree; and other points of interest.

An admirable addition in this new edition are 96 photographs (enlarged 3½ times) of timbers; these were prepared at the forest branch of Coopers Hill College from a large collection of negatives, started by Mr. C. A. Barber, now Superintendent of Botanical Survey, South India, when instructor in botany at the college.

Space is not available to enter upon a detailed account of the contents of this monumental book, but attention may be drawn to what, in our opinion, constitutes one or two shortcomings India has been divided into eight regions for the purpose of indicating the main classes of forest growth, but, unfortunately, the author decided not to give a map showing these, because he thinks a map, to be of any real use, would have to be of a rather unwieldy size and would be difficult to insert. With this view we disagree. Considering that India comprises an area of about 1½ million square miles, a map indicating the above-mentioned eight regions would have been exceedingly useful. On this map, the exceedingly varying rainfall, which practically governs the distribution of the forests, might have been shown in a summary manner, or it might have been given on a separate map. The size of these maps need not have been larger than that of a double page, and they could have been inserted with the greatest ease. Nor does the binding seem to us sufficiently strong in the case of a book of nearly 900 pages, which will be taken about in camp by those who are most in need of the information given in it.

Apart from these minor matters, we may confidently say that the book is of immense importance in the economic development of the resources of the Indian forests, and it should be, as the old edition has been, the constant companion of every Indian forest officer, and of others who take an interest in the subject.

We heartily congratulate the author on the successful completion of this new edition.

Phyllobiologie, nebst Übersicht der biologischen Blatttypen von ein und sechzig Siphonogamenfamilien. Von Prof. Dr. A. Hansgirg. Pp. xiv + 486; mit 40 Abbild. im Text. (Leipzig: Gebr. Borntraeger, 1903.) Price 10 marks.

PROF. HANSGIRG has written a big book that may have its use as a work of reference, but it certainly cannot be described as possessing an interest commensurate with its bulk. Long periods often extend over more than half a page, and are quite unbroken save for the commas delimiting the innumerable subordinate clauses that serve to qualify or define the main idea. An effort is made to classify the various kinds of leaves into different biological groups, and then the various types of leaves met with in different natural orders are successively indicated. As an example of the method, the case of the ericoid leaf-form may be cited. The type is briefly described, and then follows a *list* of plants, extending over eight pages, that are grouped under it.

In the concluding chapters a short summary of the main results is given, and their general bearing upon variation and evolution is briefly discussed. It is pointed out that closely related species often are found to possess very different kinds of leaves, and this fact is related to the combined interaction of the environment and the inherent constitution of the organism. The author seems to suggest that it may be possible to construct a sort of phylogeny of these adaptations, and so to refer them back to a primitive leaf-form. But it may be doubted whether such speculation can really advance matters very much. We know too little of the former climates and of the extent of adaptive variation these were able to evoke, and the more profitable line of inquiry would seem to be that which is directed towards an experimental treatment of plants at the present day. This line of investigation has already proved itself to be fruitful, and there is reason to think that it is by no means as yet worked out.

The Lepidoptera of the British Islands. A Descriptive Account of the Families, Genera, and Species Indigenous to Great Britain and Ireland, their Preparatory States, Habits, and Localities. By Charles G. Barrett, F.E.S. Vol. viii. Heterocera, Geometrina. Pp. 431. (London: Lovell Reeve and Co., Ltd., 1902.)

THE eighth volume of Mr. Barrett's great work on the British Lepidoptera deals with upwards of 120 species, referred to the families Acidaliidæ and Larentidæ, the latter being extended to include the genus Eubolia and its allies, sometimes treated as a distinct family. Consequently, this volume is devoted to the interesting groups of slender-bodied, broad-winged moths known as "Waves," from their white or yellow wings, crossed by waved dark lines; and "Carpets," from their intricate and festooned patterns. The great genus Eupithecia, which includes the smaller and darker moths called "Pugs" by collectors, which belongs, like the "Carpets," to the Larentidæ, stands over until the next volume.

The scope of Mr. Barrett's work is indicated by the title-page, and the workmanship, of which we have spoken fully in our notices of previous volumes, remains on the same level of uniform excellence. The present range of each species is given very fully, and this, though a subordinate point, is very useful, not at the present moment, but as supplying accurate data for a future comparison of the range of the same species in the British Islands at different periods. The works of Stephens, Stainton, Meyrick, Barrett, and of subsequent writers will enable this to be done with approximate accuracy whenever it seems desirable to make such a comparison, which will be more useful, perhaps, in the case of moths than butterflies, for the history of British butterflies, unfortunately, is one of increasing restriction of range and increasing rarity, ending, but too often, in utter extinction. Nevertheless, in the "Additions and Corrections" (p. 428), we read of the capture of a specimen of *Polyommatus Dorylas*, Hübn., near Dover, in 1902, a butterfly which, though figured as British by Lewin a century ago, has never been formally admitted into our lists, single specimens only being met with on the south coast of England, at intervals of many years.

We should mention that there is a large-paper edition of this work, illustrated by good coloured plates of all the species in their various stages; but at the moment of writing this is not before us.

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